Reasons for software failures

By Andrew Short

Overview

- Introduction
- What is failure
- Failure rates
- Failure factors
- Success factors
- Case studies

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- Failure factors
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Introduction

Does any one know the failure rate for IT projects?

Introduction

- Information system projects frequently fail. Some failure rates of large projects are reported as being between ~40% to 80%.

> “*This is a catastrophe. As an industry we are failing at our jobs.*”
>
> Dr. Paul Dorsey

- Much of the research in the field is performed by the Standish Group in their CHAOS report, and Top 10 Reasons Why Systems Projects Fail by Paul Dorsey.

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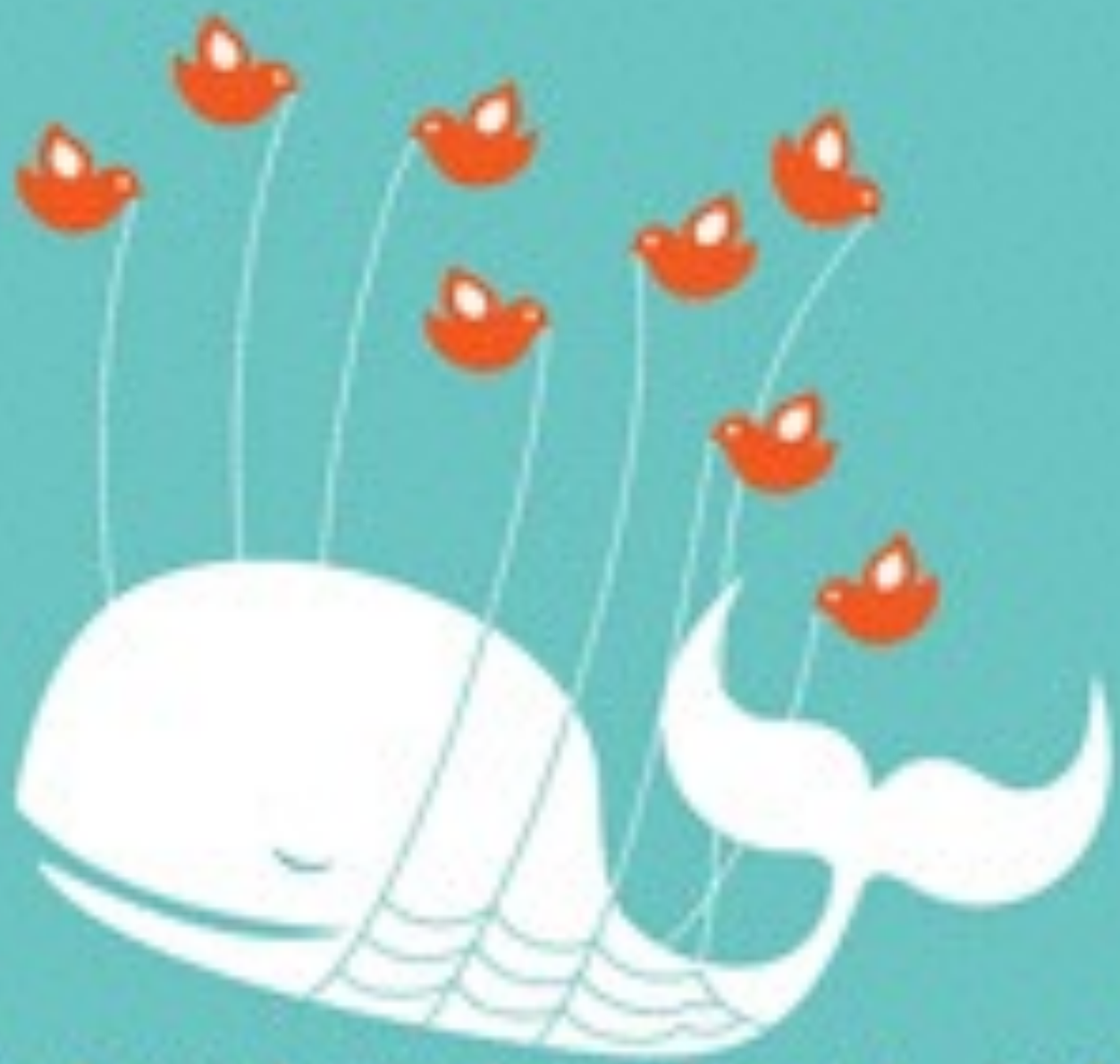
Fail



Definition of failure

Cost

Quality

Time

Definition of failure

Expectations

Cost

Quality

Time

Requirements

Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah **Cheap** Blah Blah Blah Blah Blah **Good** Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah **Fast** Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah Blah

Requirements

Cheap

Good

Fast

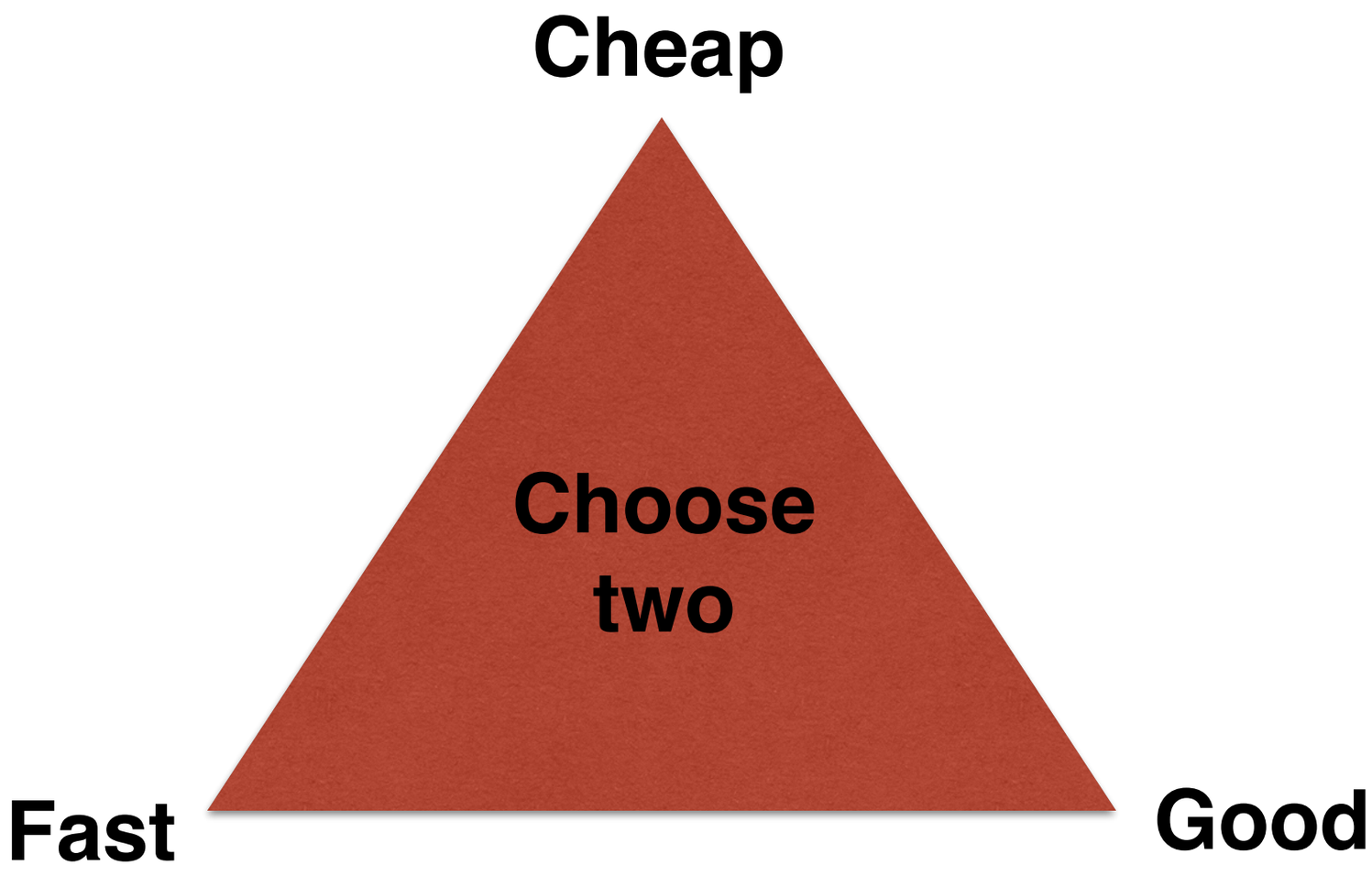
Requirements

Cheap

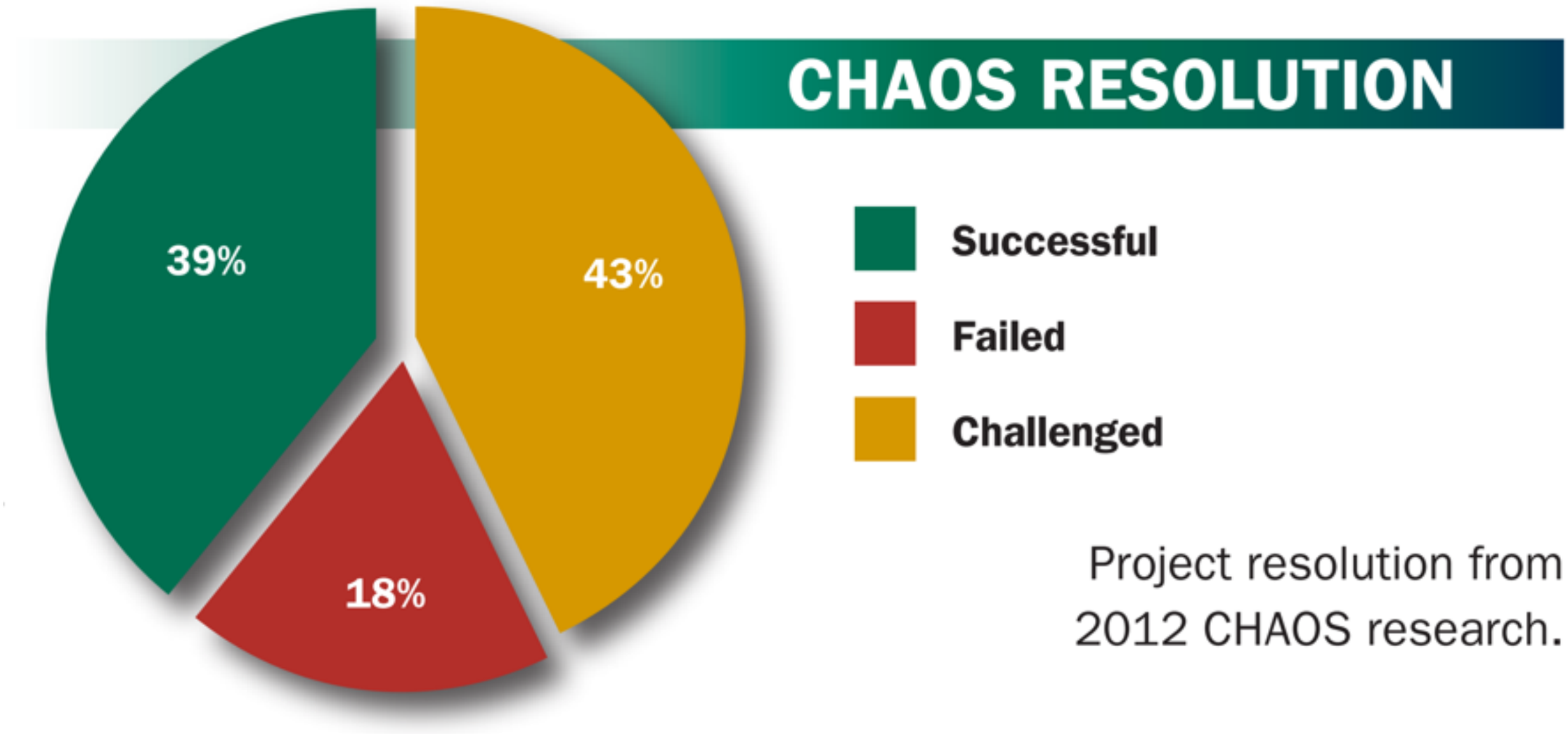
Good

Fast

Requirements



Project failure rates



Project resolution from
2012 CHAOS research.

Project failure rates

39% succeeded

Delivered on time, on budget, with required features and functions.

43% challenged

Late and/or over budget, and/or with less than the required features.

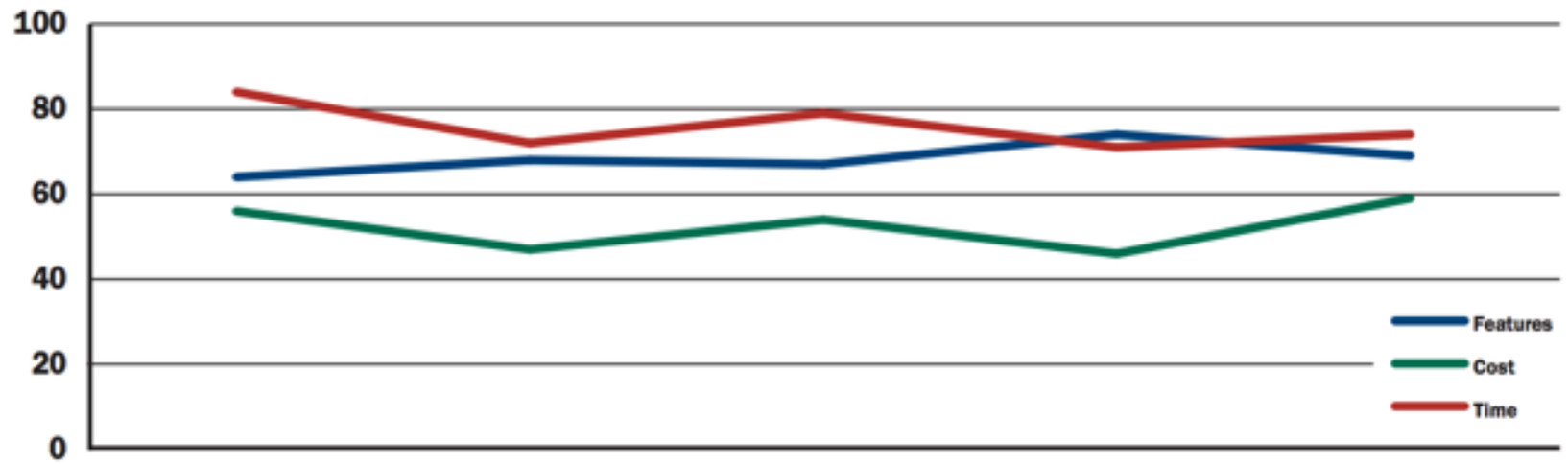
18% failed

Cancelled prior to completion or delivered and never used.

Reasons for failure

OVERRUNS AND FEATURES

Time and cost overruns, plus percentage of features delivered from CHAOS research for the years 2004 to 2012.



	2004	2006	2008	2010	2012
TIME	84%	72%	79%	71%	74%
COST	56%	47%	54%	46%	59%
FEATURES	64%	68%	67%	74%	69%

Reasons for failure

	2004	2006	2008	2010	2012
TIME	84%	72%	79%	71%	74%
COST	56%	47%	54%	46%	59%
FEATURES	64%	68%	67%	74%	69%

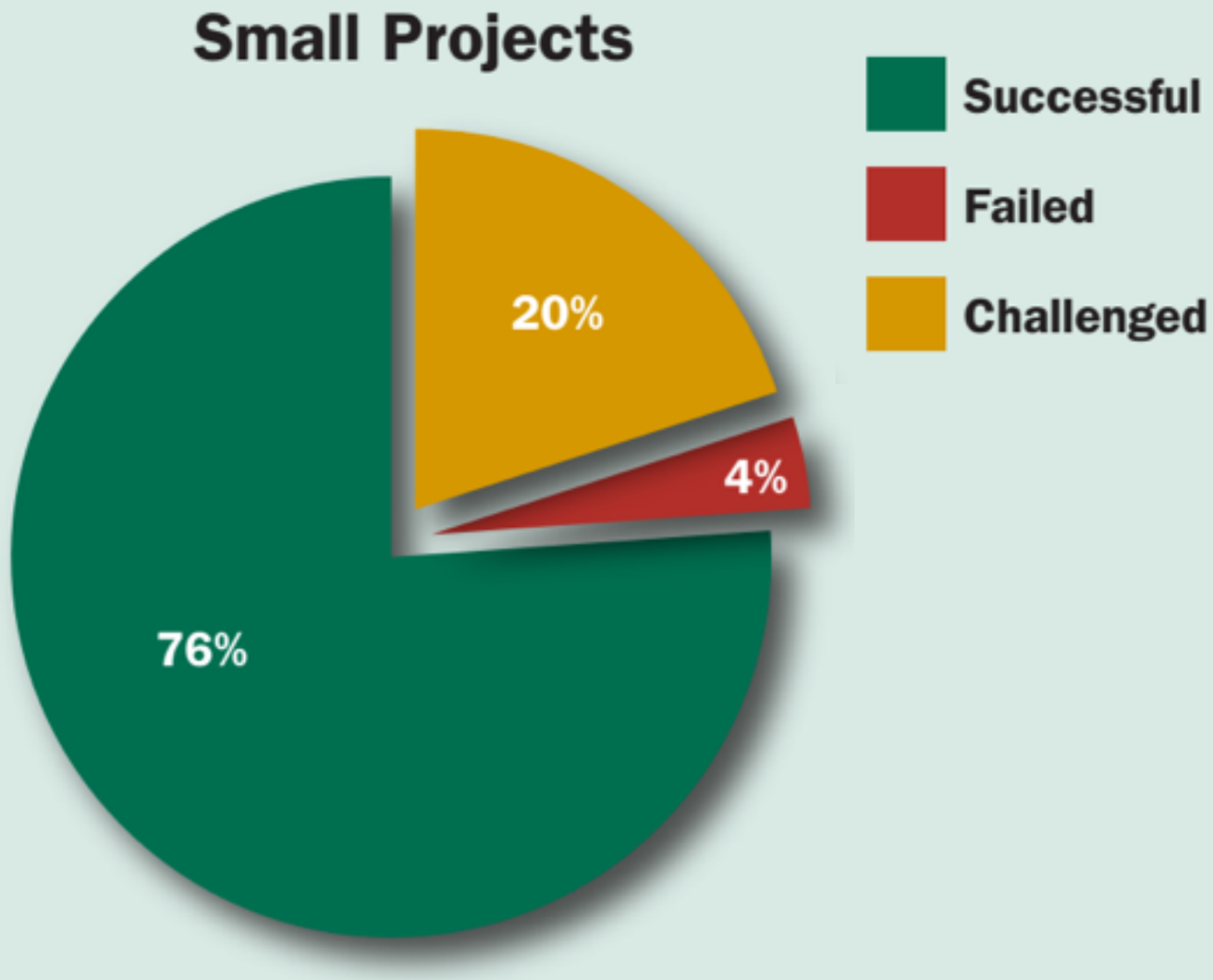
- About 10% in fluctuation in failure rates
- 20% of features are frequently used
- 50% of features are hardly ever or never used
- Reduction (74%-69%) in features seen as a good thing (focusing)

Failure rates by project size

Your turn to be asked questions….

Does any one know the failure rate for **SMALL** IT projects?

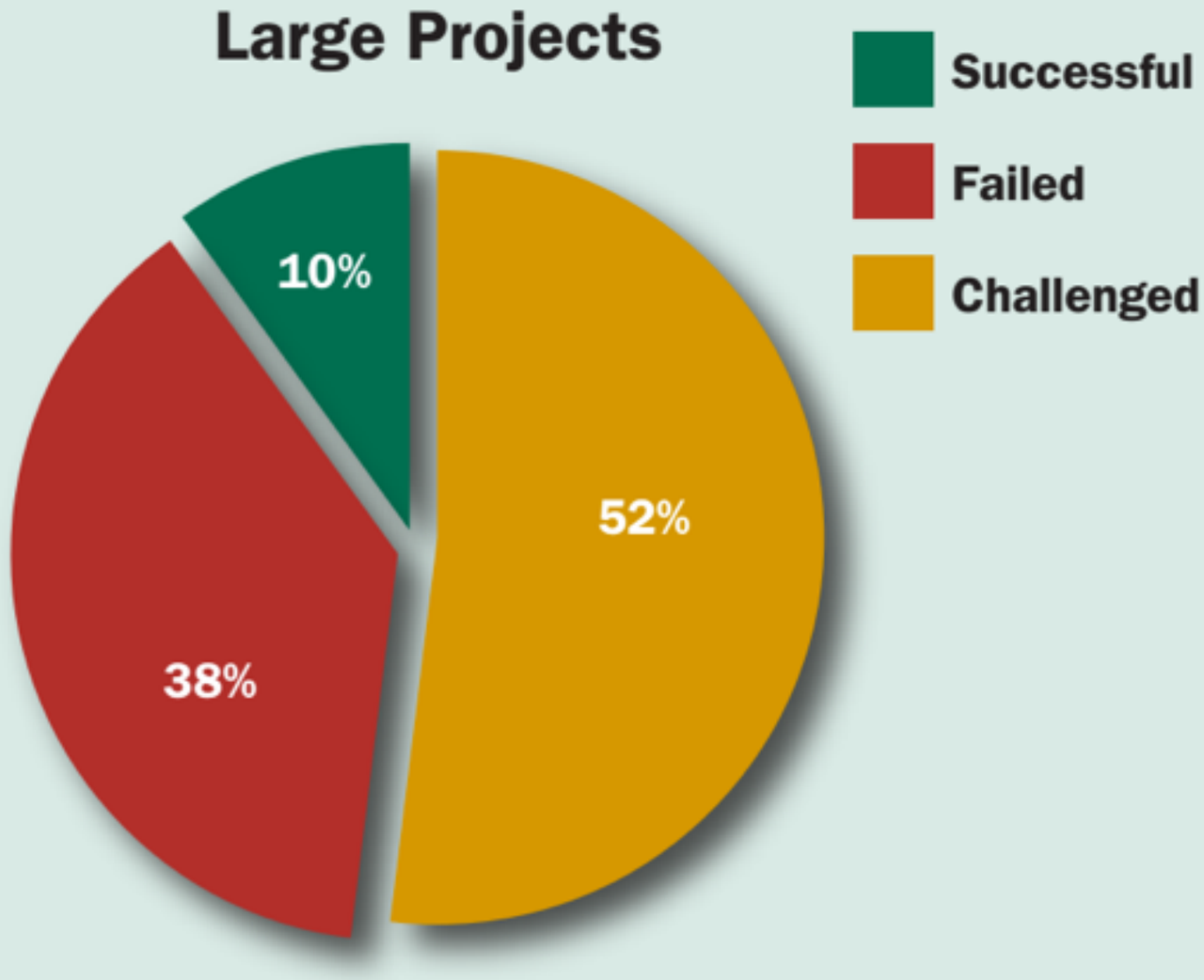
Failure rates by project size



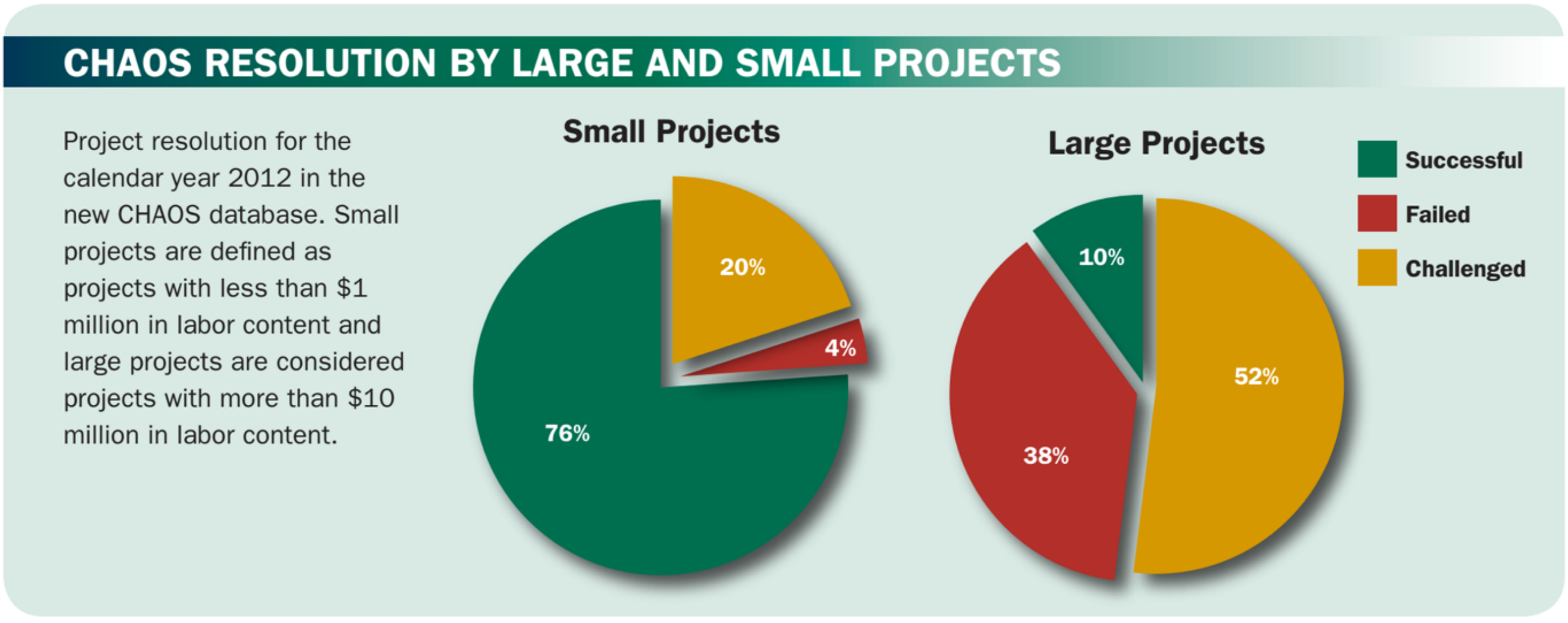
Failure rates by project size

Does any one know the failure rate for **LARGE** IT projects?

Failure rates by project size



Failure rates by project size



$1 million = ~€730,000

$10 million = ~€7.3 million

Think big, act small

- Big projects usually fail - Only 10% succeed.
- Break down into smaller parts
- Prioritise features
- Set and enforce limits

Failure factors

Project Plan

Project Plan

You need a project plan, but one of the reasons for failure is working backwards from a set finish date

“If you fail to plan you plan to fail”

My lecturer at university

Project Plan

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Benjamin Franklin

Project Plan

Key areas of failed project plans

- Failure to perform careful analysis
- Failure to take data migration into account
- Failure to accurately assess the political climate of the organization
- Failure to enlist approval at all levels of the user community

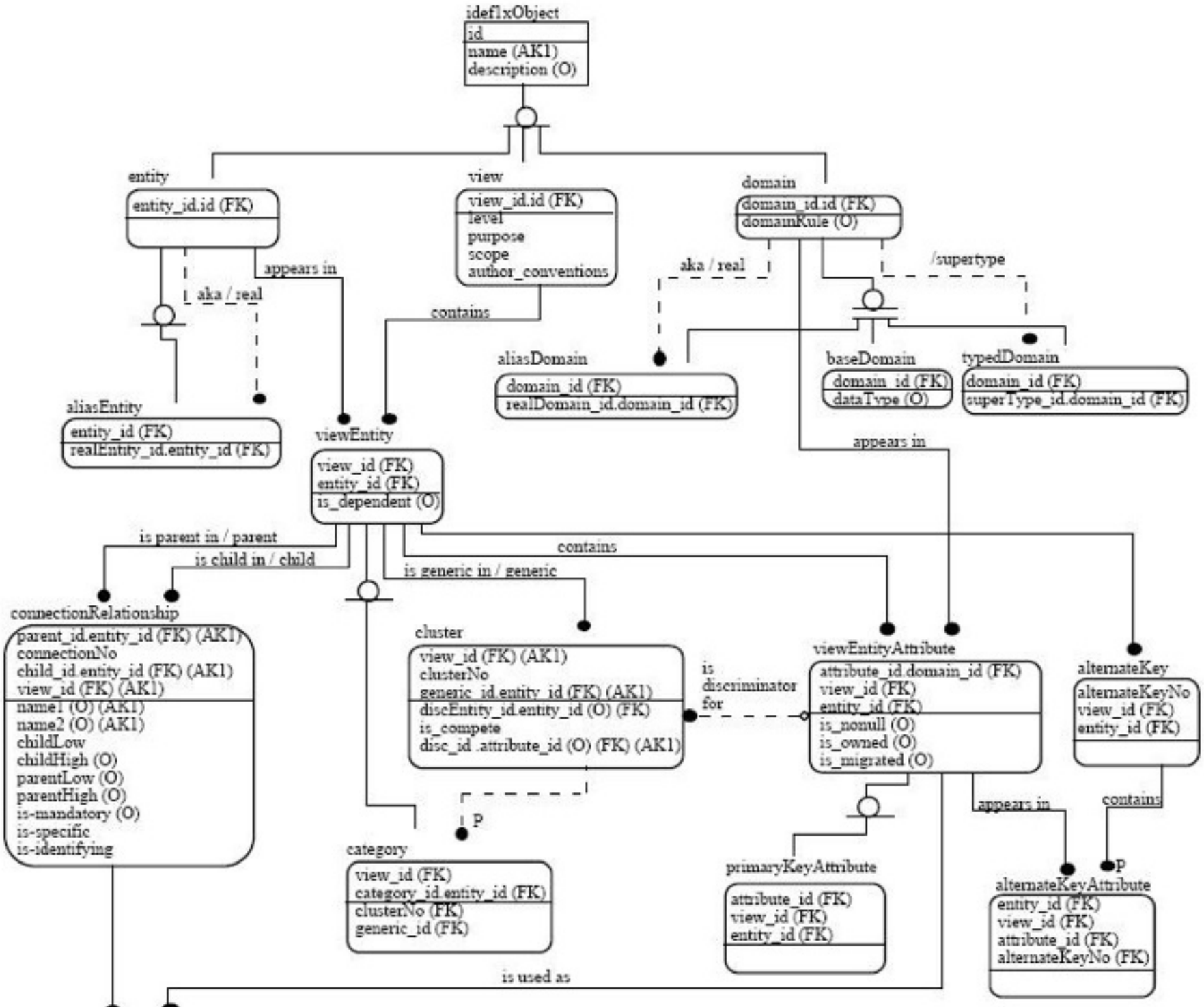
Migrate data too late

Migrate data too late

"The data migration phase of a project can consume up to 30% of the total project resources."

Dr. Paul Dorsey

Data Models


idef1xObject
id
name (AK1)
description (O)
entity
entity_id.id (FK)
view
view_id.id (FK)
level
purpose
scope
author_conventions
domain
domain_id.id (FK)
domainRule (O)
appears in
aka / real
contains
aka / real
/supertype
aliasDomain
domain_id (FK)
realDomain_id.domain_id (FK)
baseDomain
domain_id (FK)
dataType (O)
typedDomain
domain_id (FK)
superType_id.domain_id (FK)
aliasEntity
entity_id (FK)
realEntity_id.entity_id (FK)
viewEntity
view_id (FK)
entity_id (FK)
is_dependent (O)
appears in
is parent in / parent
is child in / child
contains
is generic in / generic
connectionRelationship
parent_id.entity_id (FK) (AK1)
connectionNo
child_id.entity_id (FK) (AK1)
view_id (FK) (AK1)
name1 (O) (AK1)
name2 (O) (AK1)
childLow
childHigh (O)
parentLow (O)
parentHigh (O)
is-mandatory (O)
is-specific
is-identifying
cluster
view_id (FK) (AK1)
clusterNo
generic_id.entity_id (FK) (AK1)
discEntity_id.entity_id (O) (FK)
is_compete
disc_id .attribute_id (O) (FK) (AK1)
is discriminator for
viewEntityAttribute
attribute_id.domain_id (FK)
view_id (FK)
entity_id (FK)
is_nonull (O)
is_owned (O)
is_migrated (O)
alternateKey
alternateKeyNo
view_id (FK)
entity_id (FK)
P
category
view_id (FK)
category_id.entity_id (FK)
clusterNo (FK)
generic_id (FK)
primaryKeyAttribute
attribute_id (FK)
view_id (FK)
entity_id (FK)
appears in
contains
P
alternateKeyAttribute
entity_id (FK)
view_id (FK)
attribute_id (FK)
alternateKeyNo (FK)
is used as

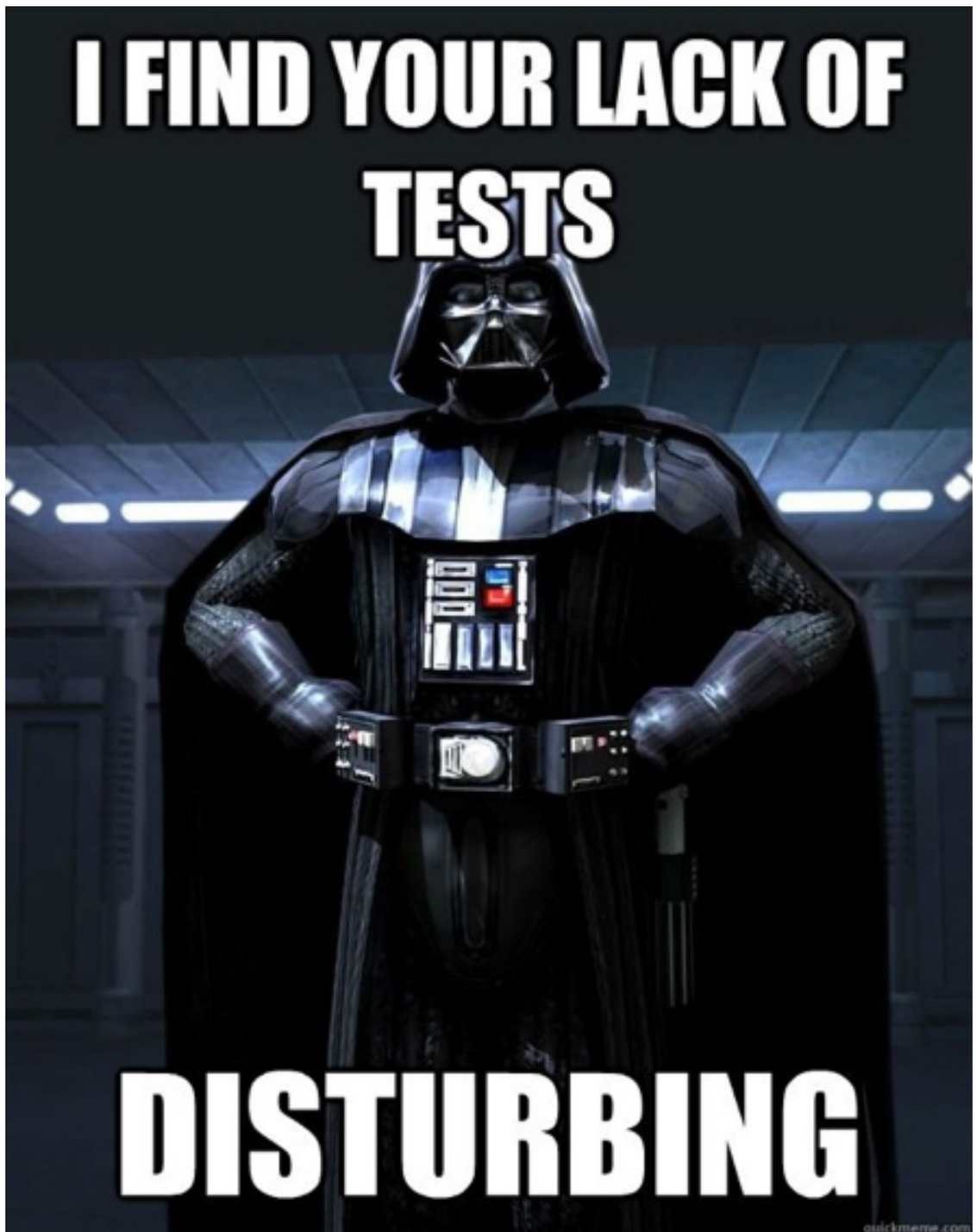
Data Models

We saw the data warehouse presentation the importance of planning you data structure

Its the core of the system which everything depends on.

Check your data models with an external source

Skip testing



Skip testing

- Not like testing a car in crash tests
- No system was ever created completely bug free
- Testing now saves time in the future
- We can only show the presence of bugs, not the absence

Buy and customise…
A lot

Buy and customise…
A lot

"The only successful way for a commercial off-the-shelf (COTS) implementation to be successful is to decide at the outset that you are going to reengineer your business to fit the limitations of the COTS business to fit the limitations of the COTSbusiness to fit the limitations of the COTS package."

Dr. Paul Dorsey

Other factors

- Hiring more developers to get the project done faster
- Hiring cheaper developers as expensive developers cost too much.
- Using tools and languages no one in the team is familiar with
- Not following a development methodology
- And many more!

Success factors

1. Management support

1. Management support

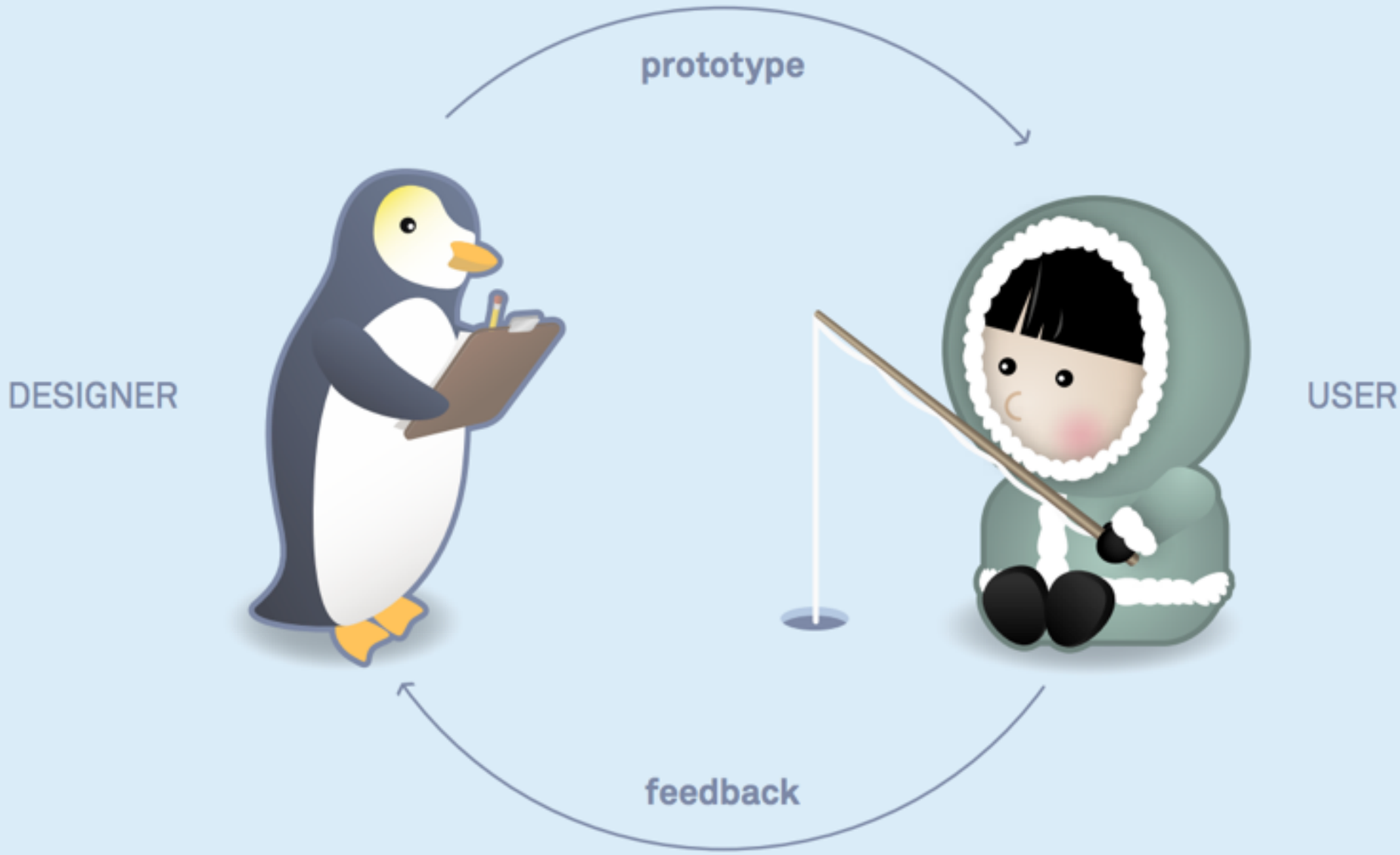
- Simple vision (stakeholders visions)
- Commitment (from executives)
- **Blink** (make decisions)
- Velocity (stepping stones / milestones)
- Education (project understanding)
- Kill switch (triggers)
- Celebrate (success)

1. Management support

Blink

- The larger the project, the more decisions that have to be made.
- A general rule is 1.5 decisions for every $1,000 in labor cost.
- A million-dollar project will have 1,500 decisions, while a $10 million project will have 15,000.
- The executive sponsor will be required to participate in about 20% of these decisions.
- The difference is 300 decisions versus 3,000 decisions.

2. User involvement



Pascal Raabe 2010

2. User involvement

- Identification (key users)
- Rapport (user relationship)
- Soapbox (communication channels)
- Outcomes (stepping stones / milestones)
- **Schooling** (teaching)

2. User involvement

Schooling

- Schooling is the teaching, learning, and transfer of information to and from the project team and to and from the users.
- The reason small projects have greater success is because the road is shorter with fewer exit ramps.
- Generally, in small projects there are fewer things to transfer to fewer people, yet it allows for greater creativity and breakthrough solutions.

3. Optimisation

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- Scope (Prioritise tasks)
- Accurate Estimates (Estimate tasks)
- Expectations (managing)
- **Butterfly Effect** (big impact)
- Optimal Team (SEAL - Specialised, Exceptional, Assortment, Love)

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3. Optimisation

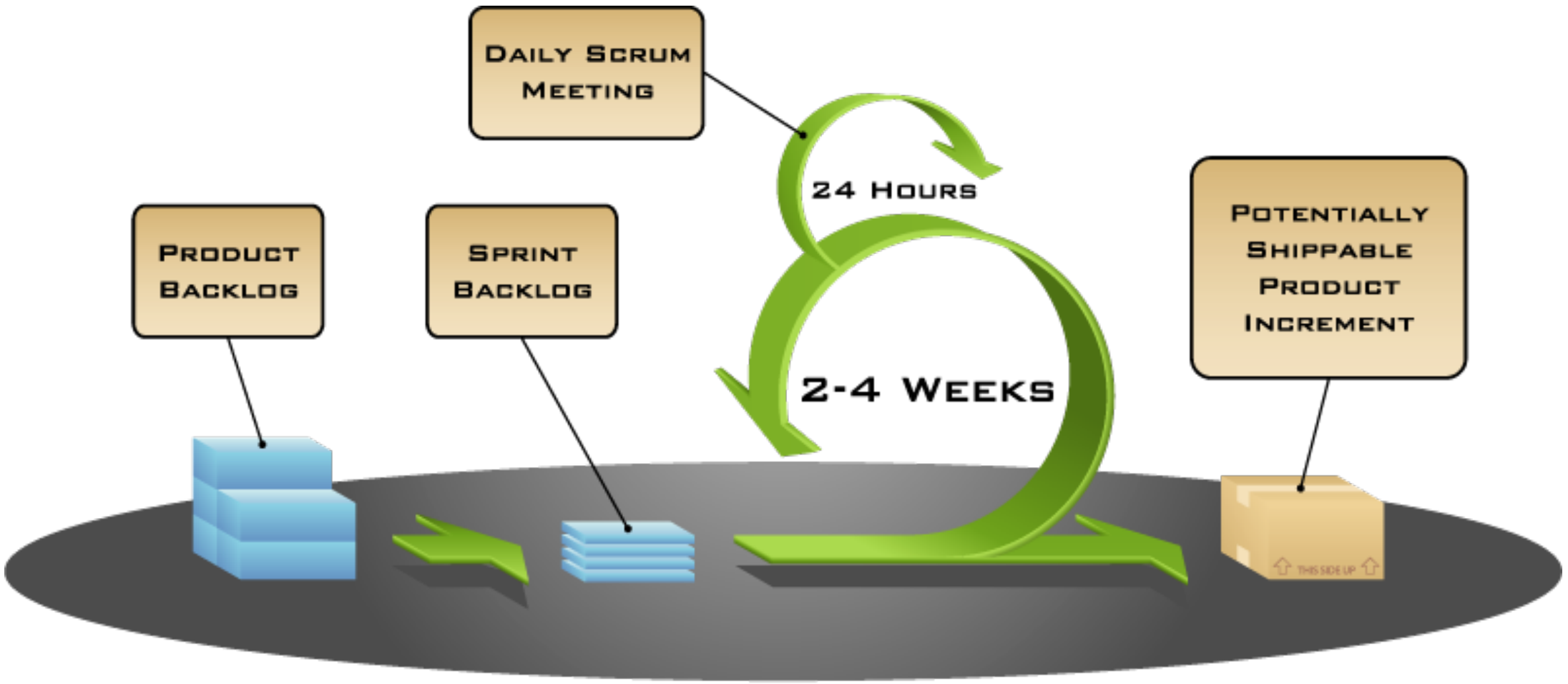
Butterfly Effect

- Small projects make a big impact.
- Small projects also pave the way for more small projects
- Success creates an environment that breeds further success.
- The challenge is to make sure that the organisation does not get over confident

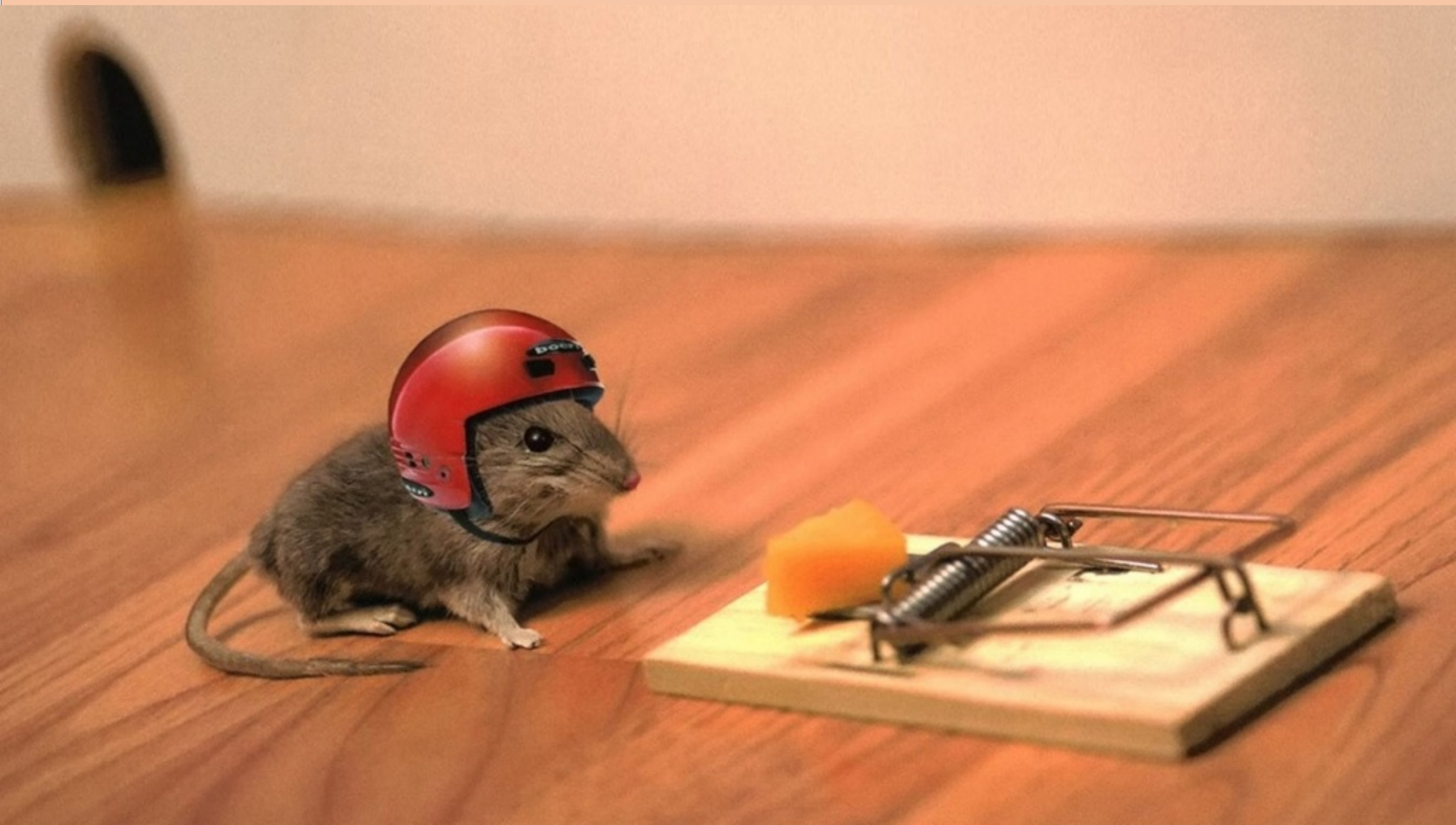
4. Skilled resources

5. Project management expertise

6. Agile process



7. Clear objectives



8. Emotional maturity

The Emotions of Chuck Norris

Guilt

Suffering

Pleasure

Remorse

Anger

Kindness

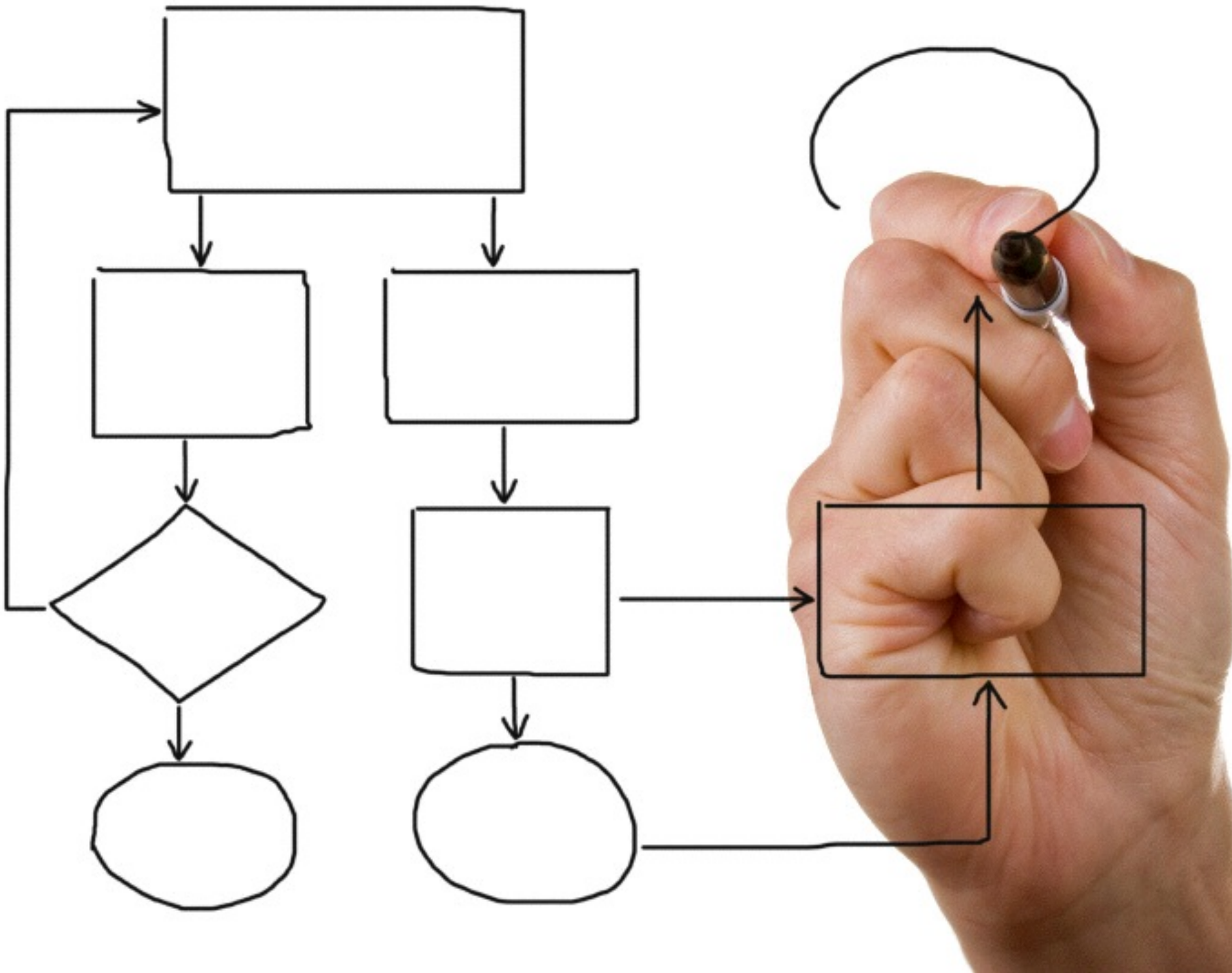
Surprise

Desire

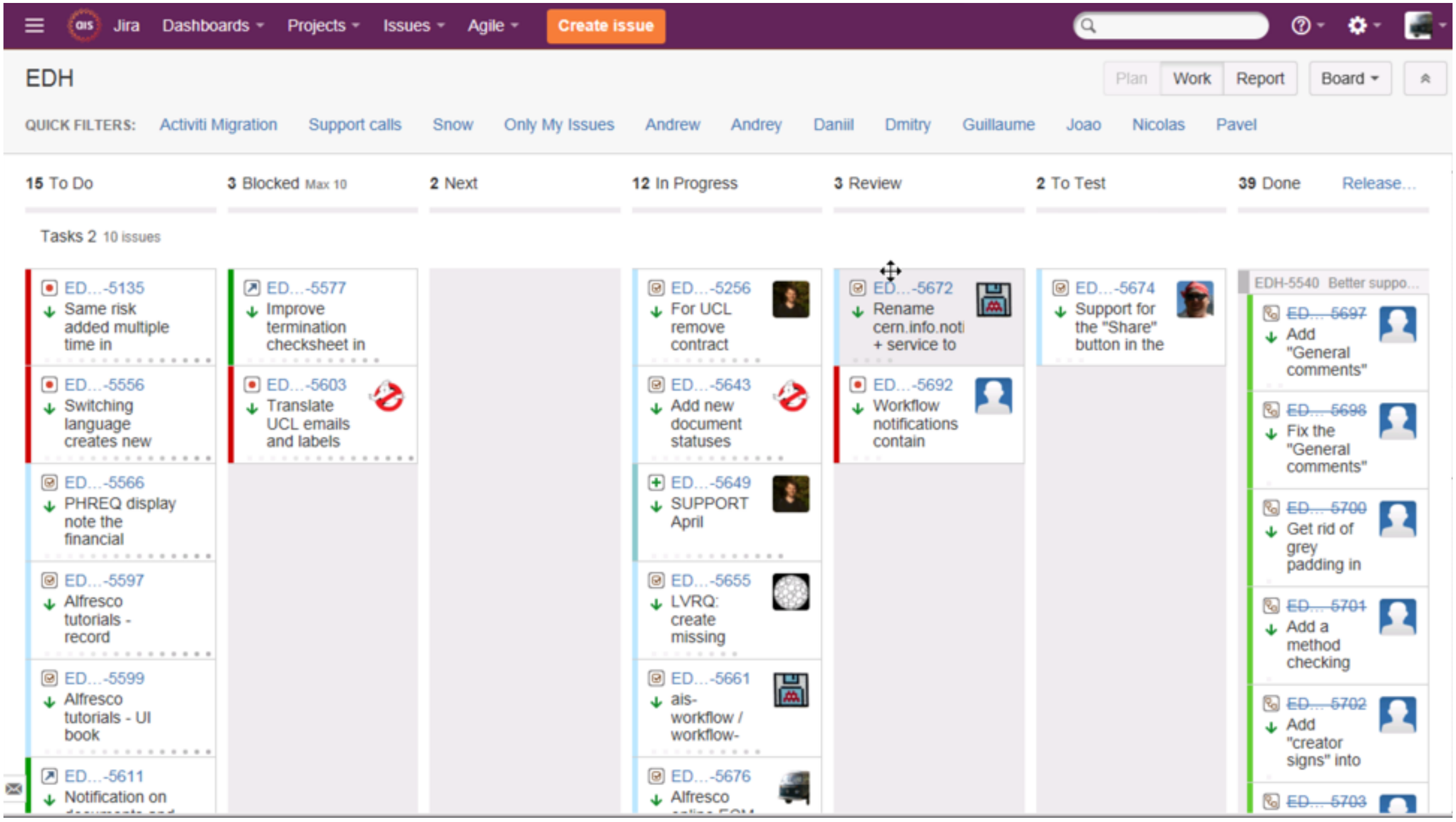
Love

Despair

9. Execution



10. Tools and infrastructure



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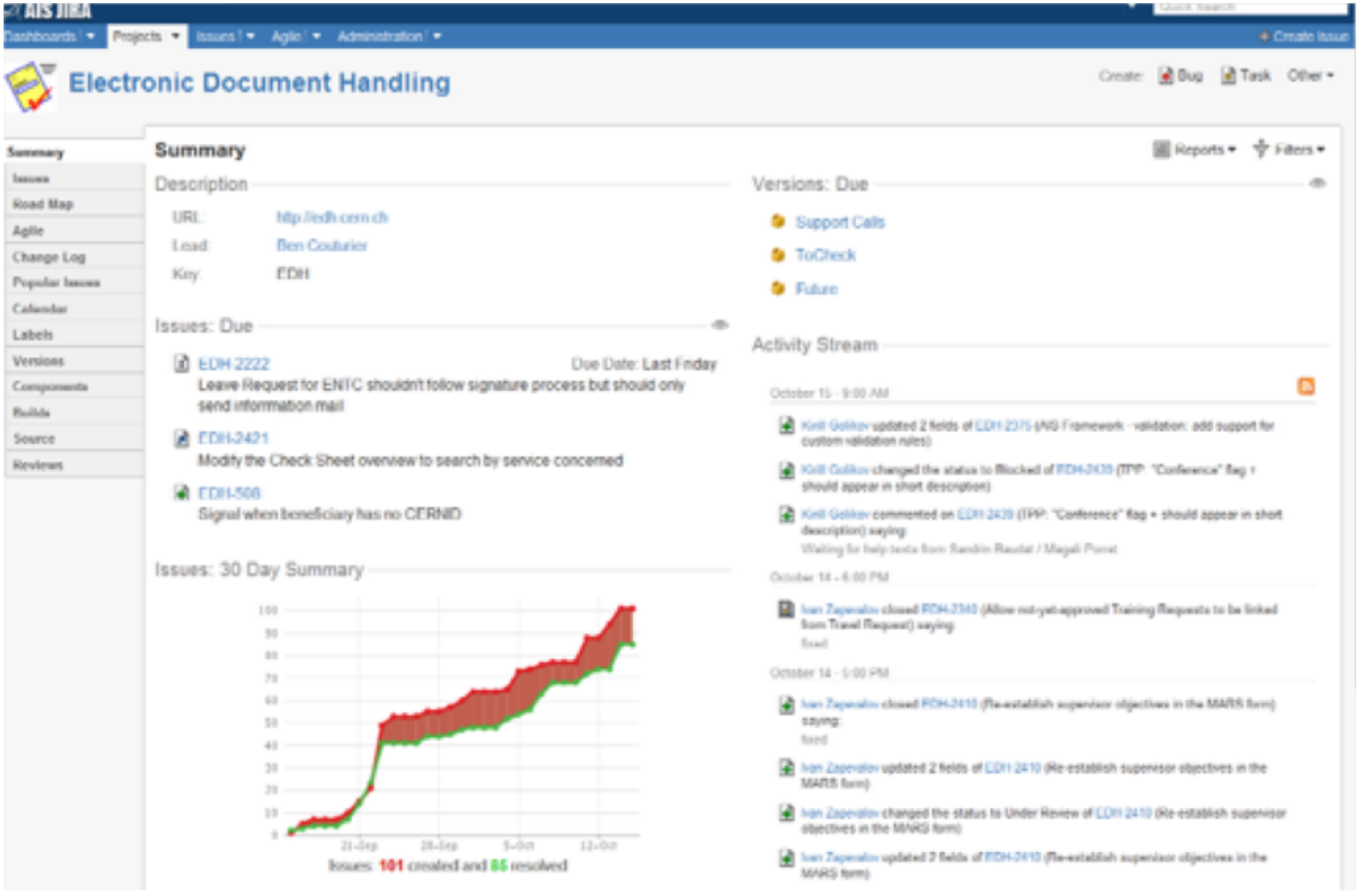


10. Tools and infrastructure

Jira Dashboards Projects Issues Agile Create issue

GS-AIS-EB Dashboard

Tools

Time Sheet

Summary for **Andrew Short** and filter **Filter for EDH** (Details)
<< wk mo >>

			Mon 7/Apr	Tue 8/Apr	Wed 9/Apr	Thu 10/Apr	Fri 11/Apr	Sat 12/Apr	Sun 13/Apr	Tot
EDH-5529	Support task March 2014	↓	1h	4h	2h	0.25h	4h			11.25h
EDH-5636	add new depot for CERN and PREVESSIN	↑				2h				2h
EDH-5669	Alfresco - Create metadata model for DRSC	↓					2h			2h
EDH-5673	Create alfresco repository svn	↓	2h							2h
EDH-5676	Alfresco online ECM tutorial	↓	1h		1h	0.5h				2.5h
EDH-5678	Alfresco local installation	↓	2h							2h
EDH-5679	Alfresco project plan	↓	3h	3h	3h	1.25h				10.25h
EDH-5687	Alfresco Meetings - April	↓	1h	1h		4h	2h			8h
Total:			10h	8h	6h	8h	8h			40h

Time Sheet

Summary for group **eb-developers** and filter **Filter for EDH** (Details)
<< wk mo >>

	Mon 7/Apr	Tue 8/Apr	Wed 9/Apr	Thu 10/Apr	Fri 11/Apr	Sat 12/Apr	Sun 13/Apr	Tot
Andrey Avtomonov	7h	4h		6h	6h			23h
Aistools Internal app links								
Andrew Short	10h	8h	6h	8h	8h			40h
Daniil Meshkov			1h					1h
Dimitry Potapov	8h	8h	8h	8h	7h			39h
Guillaume Ame	6.5h		1h					7.5h

Issues in progress

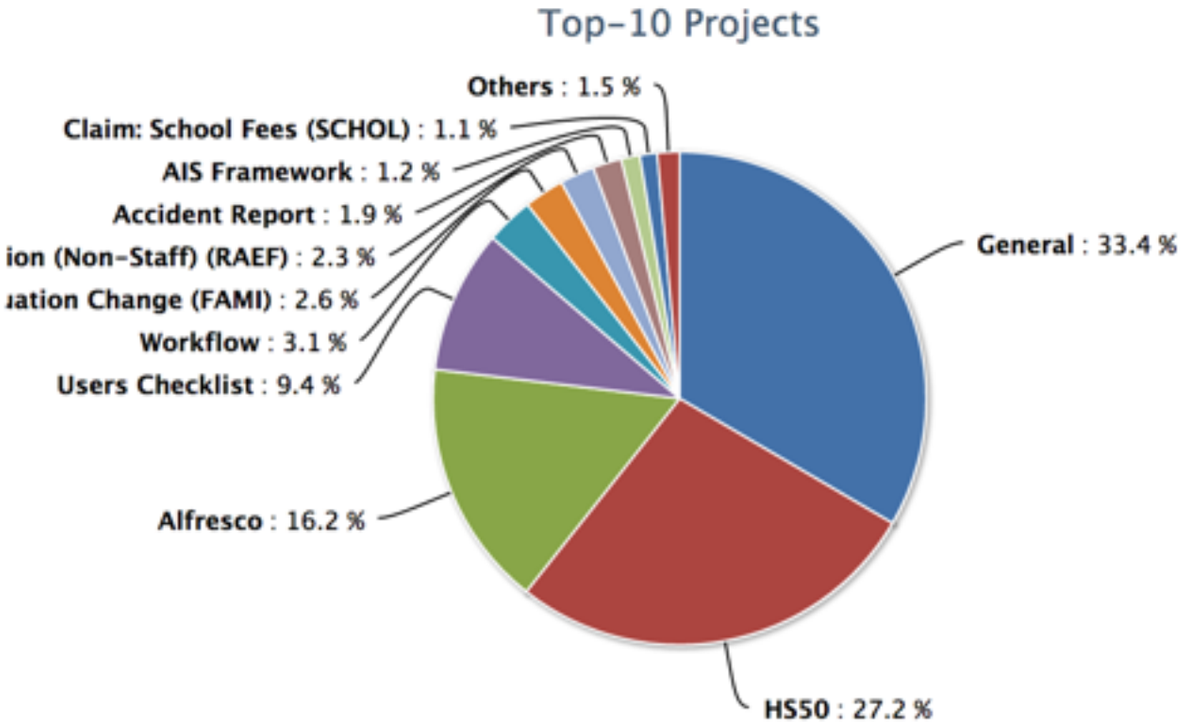
T	Key	Summary	P
	EPW-194	Alfresco	↓
	EDH-5676	Alfresco online ECM tutorial	↓
	EDH-5687	Alfresco Meetings - April	↓

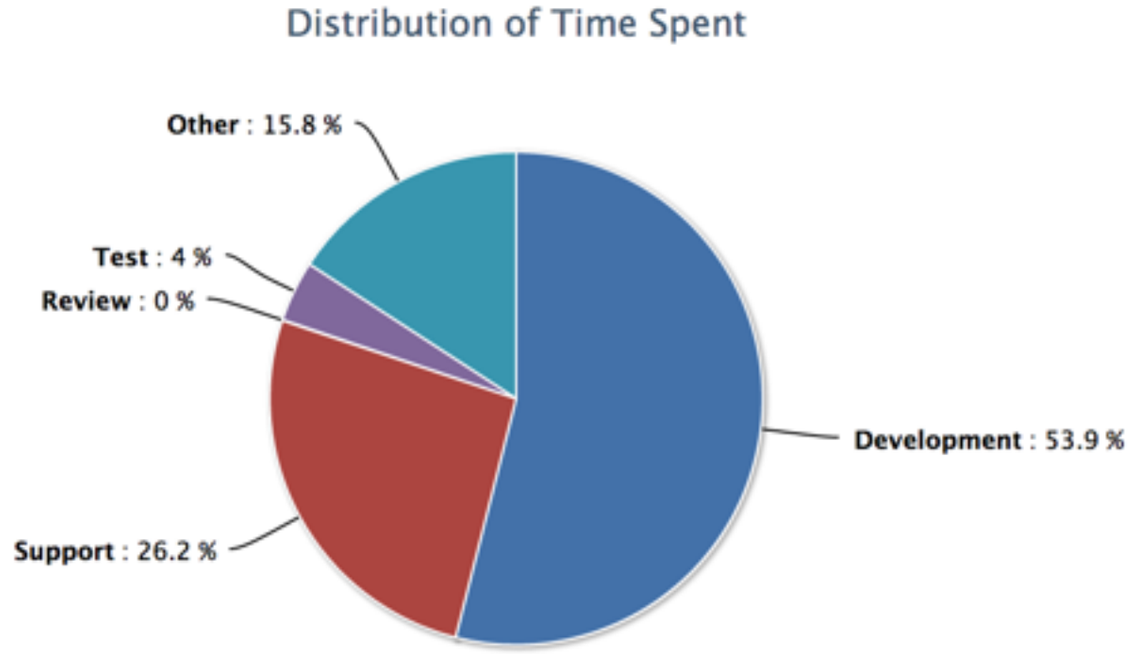
1–3 of 3

Assigned to Me

T	Key	Summary	P
	EPW-17	MARS Changes for the new competency model	↑
	EPW-18	EDH CCM Document v1	↑
	EPW-65	Recruitment Request changes for the new competency model	↑
	EPW-92	CCM release and follow -up	↑
	EPW-140	Update documentation in Confluence	↑
	EDH-4304	MARS 2012: Modify development objectives for the reference period to support competencies	↑
	EDH-4312	MARS 2012: Update Birt Report	↑

10. Tools and infrastructure





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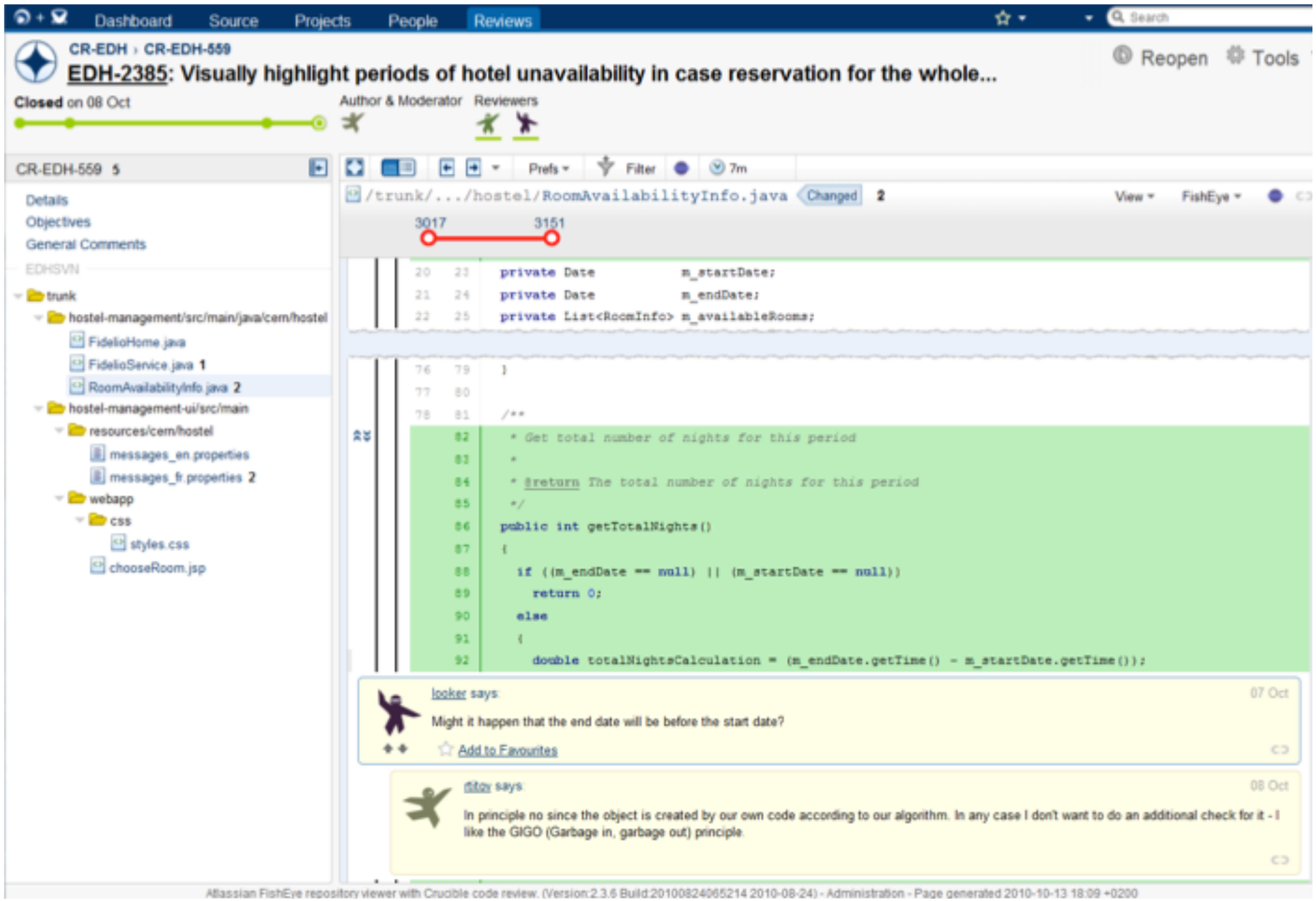


Factors of success

1. Executive management support
2. User involvement
3. Optimisation
4. Skilled resources
5. Project management expertise
6. Agile process
7. Clear business objectives
8. Emotional maturity
9. Execution
10. Tools and infrastructure

NHS case study

- National Health Service (NHS) (≈ Sistema Nacional de Salud)
- UK, government run
- National Program for IT (NPfIT) 2002 - 2011
- Believed to be the largest IT healthcare system in the world
- >14 billion euros spent… 14,000,000,000!
- Designed to reform the way the NHS uses data

NHS case study

Leadership and management changes

- Main project leader left taking valuable expertise

Staff expressed usability concerns

- Users involved too late
- When finally involved they expressed serious concerns

Skills and capacity shortages

- Left inexperienced project leaders to take over

Complexity

- Failed to split the project into smaller tasks
- Goals were not achievable

FBI case study

- Federal Bureau of Investigation (FBI)
- US, government run
- Virtual Case File (VCF) 2000 - 2005
- Would replace several older software systems
- ~123 million euros spent… 123,000,000!
- Designed to modernise IT system

FBI case study

Leadership and management changes and expertise

- Lack of training, experience and micromanagement
- Contributed to specification problems
- Micromanagement of software developers

Users complained system was unusable

- Users involved too late

Lack of Skilled Resources

- Personnel who had little or no training
- Lack of training, experience and micromanagement

Missing clear objectives

- Requirements were continually added to the system even as it was falling behind schedule

case study

- National Aeronautics and Space Administration (NASA)
- US, government run
- Mars Climate Orbiter 1998 - 1999
- Built by Lockheed Martin
- ~238 million euros spent
- Designed to study martian climate and atmosphere

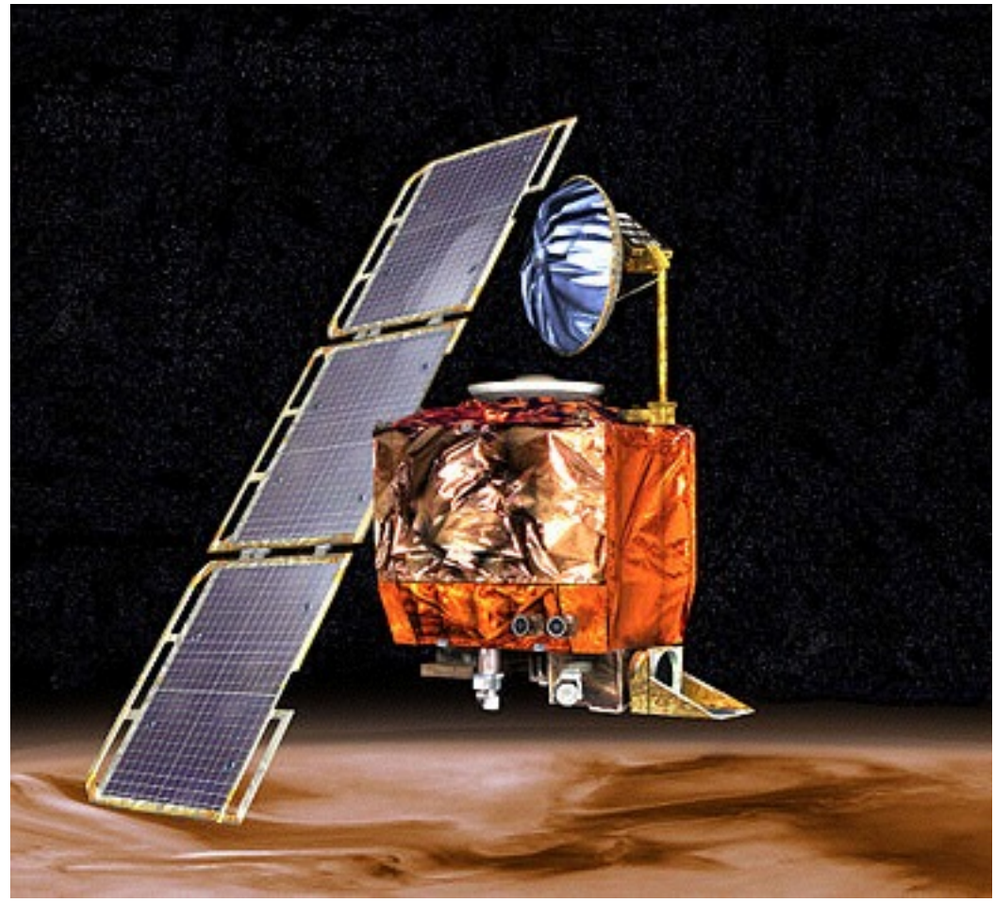
case study

Insufficient testing

- Testing missed failed to find the issue.

Lack of requirements understanding

- It was assumed that metric units would be used.



Your challenge

- Come in the top 39% of successful projects
- Don’t go over time or cost restrictions.
- Deliver a high quality product and improve the reputation of the IT industry.
- Don't be next years case study!

Thank you

Speaker: Andrew Short

References

References

- Standish Group. 2014. CHAOS Report. [ONLINE] Available at: http://versionone.com/assets/img/files/ChaosManifesto2013.pdf. [Accessed 05 April 14].

- Dr. Paul Dorsey. 2014. Top 10 Reasons Why Systems Projects Fail. [ONLINE] Available at: http://www.hks.harvard.edu/m-rcbg/ethiopia/Publications/Top%2010%20Reasons%20Why%20Systems%20Projects%20Fail.pdf. [Accessed 05 April 2014].

- UK House of Commons. 2013. The dismantled National Programme for IT in the NHS. [ONLINE] Available at: http://www.publications.parliament.uk/pa/cm201314/cmselect/cmpubacc/294/294.pdf. [Accessed 01 April 14].

- Shuhab-u-Tariq. 2010. Why do IT projects fail. [ONLINE] Available at: http://www.shuhab.com/Downloads/WhyDoITProjectsFail.pdf. [Accessed 01 April 14].

- Douglas Isbell et.al. 1999. Mars climate orbiter team finds likely cause of loss. [ONLINE] Available at: http://mars.jpl.nasa.gov/msp98/news/mco990930.html [Accessed 01 April 14].

Further reading

- List of failed software projects: http://spectrum.ieee.org/computing/software/why-software-fails

- List of failures: http://project-management.com/top-10-main-causes-of-project-failure/

- Failure of Corporate Websites: http://www.nngroup.com/articles/failure-of-corporate-websites/

- Reasons for failure: http://info.psu.edu.sa/psu/cis/biq/SE501/a/a1/MajorCausesofSoftwareProjectFailures.pdf

References: Images

Intro: Map data [Google]. 2014. [ONLINE] Available at: maps.google.com [Accessed 14 April 2014].

Overview: Just Gif. Ski start fail [ONLINE] Available at: http://justgif.com/tags/2863/skiing?tag=2863 [Accessed 14 April 2014].

Fail slide: Karol Krakowiak. Twitter Fail Whale. [ONLINE] Available at: https://www.flickr.com/photos/karol-krakowiak/3395138515/?rb=1 [Accessed 14 April 2014].

Definition of failure
Nature's Sunshine's Four Point Path to Unsurpassed Quality. 2013. [ONLINE] Available at: http://holistichealthjournal.me/2013/11/natures-sunshines-four-point-path-unsurpassed-quality-video/ [Accessed 14 April 2014].

Busyness and time alarm clock. 2013. [ONLINE] Available at: http://imperfectspirituality.com/2013/03/27/how-to-move-into-the-moment-now/friends-and-time-alarm-clock-2/ [Accessed 14 April 2014].

Satisfaction Guaranteed 100 Percent Stamp clip art. 2012. [ONLINE] Available at: http://www.clker.com/clipart-satisfaction-guaranteed-100-percent-stamp.html [Accessed 14 April 2014].

References: Images

Satisfaction Guaranteed 100 Percent Stamp clip art. 2012. [ONLINE] Available at: http://www.clker.com/clipart-satisfaction-guaranteed-100-percent-stamp.html [Accessed 14 April 2014].

Beyond Technology: Supporting Your Abstract Management System. [ONLINE] Available at: http://blog.omnipress.com/2011/10/beyond-technology-supporting-your-abstract-management-system/ [Accessed 14 April 2014].

Tourist Tube Map. 2008. [ONLINE] Available at: http://b3ta.com/challenge/maps/all/page8 [Accessed 14 April 2014].

Very British! Memorable Images 53. Lord Kitchener. [ONLINE] Available at: http://www.sterlingtimes.org/memorable_images53.htm [Accessed 14 April 2014].

Topics in Scrum. 2005. [ONLINE] Available at: http://www.mountaingoatsoftware.com/agile/scrum/images/ [Accessed 14 April 2014].

Animals. 2011. [ONLINE] Available at: http://www.goodwp.com/animals/16789-mouse-mousetrap-cheese-helmet.html [Accessed 14 April 2014].

Chuck Norris doesn't need DevOps, but have we beat "What is DevOps" to death yet? 2014. [ONLINE] Available at: http://devops.com/blogs/chuck-norris-doesnt-need-devops-but-have-we-beat-what-is-devops-to-death-yet/ [Accessed 14 April 2014].

process analysis and optimization. 2011. [ONLINE] Available at: http://www.turnkeyprocessing.com/our-services/process-analysis-optimization.html [Accessed 14 April 2014].

References: Images

juliennebarry. 2012. [ONLINE] Available at: http://gifsoup.com/view/3712688/seal-clapping.html [Accessed 14 April 2014].

Rumour: The SAS Need Bigger Guns. 2013. [ONLINE] Available at: http://www.gizmodo.co.uk/2013/03/rumour-the-sas-need-bigger-guns/ [Accessed 14 April 2014].

Firefox(Customized Nike Dunk High). 2011. [ONLINE] Available at: http://www.claudiaciuta.com/?attachment_id=2669 [Accessed 14 April 2014].

quickmeme. [ONLINE] Available at: http://www.quickmeme.com/meme/36grp3/ [Accessed 14 April 2014].

Wikipedia. 1993. [ONLINE] Available at: http://en.wikipedia.org/wiki/File:B_5_1_IDEF1X_Diagram.jpg [Accessed 14 April 2014].

simplyjan. 2012. [ONLINE] Available at: http://simplyjan.wordpress.com/tag/running-late/

Topics in Scrum. 2005. [ONLINE] Available at: http://www.mountaingoatsoftware.com/agile/scrum/images/ [Accessed 14 April 2014].